

What is claimed is:

1        1.            A metal powder composition for use in selective laser sintering,  
2        comprising:  
3                    an iron-based powder material;  
4                    a nickel and/or nickel alloy powder material;  
5                    a copper and/or copper alloy powder material; and  
6                    a graphite powder material.

1        2.            The metal powder composition according to claim 1, wherein a  
2        proportion of the graphite powder material ranges from 0.2 weight percent to 1.0  
3        weight percent.

1        3.            The metal powder composition according to claim 2, wherein a  
2        proportion of the iron-based powder material ranges from 60 weight percent to 90  
3        weight percent, a proportion of the nickel and/or nickel alloy powder material ranges  
4        from 5 weight percent to 35 weight percent, and a proportion of the copper and/or  
5        copper alloy powder material ranges from 5 weight percent to 15 weight percent.

1        4.            The metal powder composition according to claim 1, wherein at least  
2        one of a condition that the iron-based powder material comprises a chrome  
3        molybdenum steel powder material and a condition that the copper alloy powder  
4        material comprises a copper manganese alloy material is satisfied.

1        5.            The metal powder composition according to claim 4, wherein a  
2        proportion of the chrome molybdenum steel powder material ranges from 60 weight  
3        percent to 80 weight percent, a proportion of the nickel powder material ranges from  
4        15 weight percent to 25 weight percent, a proportion of the copper manganese alloy  
5        powder material ranges from 5 weight percent to 15 weight percent, and a proportion  
6        of the graphite powder material ranges from 0.2 weight percent to 0.75 weight  
7        percent.

1        6.            The metal powder composition according to claim 1, wherein each of  
2        the iron-based powder material, the nickel and/or nickel alloy powder material, and

3 the copper and/or copper alloy powder material has an average particle diameter  
4 ranging from 5 $\mu$ m to 50 $\mu$ m.

1 7. The metal powder composition according to claim 6; wherein the  
2 iron-based powder material has an average particle diameter less than that of the  
3 nickel and/or nickel alloy powder material and that of the copper and/or copper alloy  
4 powder material.

1 8. The metal powder composition according to claim 7, wherein the  
2 average particle diameter of the iron-based powder material is less than about three  
3 quarters of that of the nickel and/or nickel alloy powder material and the copper  
4 and/or copper alloy powder material.

1 9. The metal powder composition according to claim 6, wherein the  
2 iron-based powder material is mainly composed of aspherical particles, while each of  
3 the nickel and/or nickel alloy powder material and the copper and/or copper alloy  
4 powder material is mainly composed of spherical particles.

1 10. The metal powder composition according to claim 9, wherein the  
2 iron-based powder material comprises a chrome molybdenum steel powder material  
3 having an average particle diameter less than 25 $\mu$ m.

1 11. The metal powder composition according to claim 9, wherein the  
2 graphite powder material comprises particles having a maximum length less than the  
3 average particle diameter of the iron-based powder material.

1 12. The metal powder composition according to claim 1, wherein the metal  
2 powder composition comprises granulated powder.

1 13. The metal powder composition according to claim 1, further comprising  
2 a carbide-producing element mixed therein.

1 14. A method of making a metal powder composition according to any one  
2 of claims 1 to 13, comprising:

3 preparing an iron-based powder material;

4 preparing a nickel and/or nickel alloy powder material;

5 preparing a copper and/or copper alloy powder material;  
6 mixing the iron-based powder material, the nickel and/or nickel alloy  
7 powder material, and the copper and/or copper alloy powder material;  
8 mixing graphite flakes in a mixture of the iron-based powder material,  
9 the nickel and/or nickel alloy powder material, and the copper and/or copper alloy  
10 powder material; and  
11 crushing a resultant mixture.

1 15. A three-dimensional object shaped by sintering the metal powder  
2 composition according to any one of claims 1 to 13.